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Ginger (*Zingiber officinale* Rosc.) germplasm evaluation for yield and quality in southern West Bengal

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Abstract

The experiment was conducted to assess ginger (*Zingiber officinale*) germplasm for yield and quality at Nadia (West Bengal). The experiment with 10 treatments was laid out in a Randomized Block Design with three replications. Ginger germplasm namely Suprabha, Suruchi, Suravi, V₃S₁-8, Himgiri, IISR Varada, IISR Mahima, IISR Rejatha, Gorubathan (local cv.) and Sambuk (local cv.) were selected for the study. The investigation indicated Gorubathan as the most promising germplasm in terms of growth and yield. The yield attributes like length of primary fingers (2.28 cm), diameter of secondary fingers (1.95 cm), rhizome yield plant⁻¹ (0.201 kg) were highest with Gorubathan. The projected fresh yield was maximum (18.27 t ha⁻¹) in Gorubathan but dry recovery was maximum with Sambuk (33.48%) and maximum oleoresin was with Suravi (10.25%).

Keywords: germplasm, ginger, yield evaluation, *Zingiber officinale*

In spite of immense scope and possibility for the development of ginger (*Zingiber officinale* Rosc.) in West Bengal, very little attempt has so far been made to utilize the agro-ecological condition of the state ranging from sea-coast to an altitude of about 3657 m above MSL. Commercial cultivation of ginger is mainly restricted to the district of Darjeeling. But it can also be successfully cultivated commercially in the plains of West Bengal as an irrigated crop. The commercial ginger cultivation in the plains of West Bengal is restricted mainly due to

insufficient information on appropriate varieties with improved agro-techniques.

With this background, an experiment was undertaken to identify suitable variety/varieties for southern part of West Bengal. The experiment was conducted for two years (2009–10 and 2010–11) at Jaguli Instructional farm, Bidhan Chandra Krishi Viswavidyalaya, Nadia, West Bengal. The site of the experiment is situated at 22.93° N latitude and 88.53° E longitude with an elevation of 9.75 m above MSL. The climate of experimental site is sub-

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humid and situated just south of the tropic of cancer. Planting was done in the month of May and rhizomes were harvested in the month of March.

Ten cultivars *viz.*, Suprabha, Suruchi, Suravi, V₃S₁-8, Himgiri, IISR Varada, IISR Mahima, IISR Rejatha, Gorubathan (local cv.), and Sambuk (local cv.) selected for study. The experiment was laid out in RBD with three replications. The entire experimental field was levelled properly and was divided into three blocks and each block was divided into 10 plots. Raised bed of 3 m length and 1m width was prepared. The ginger rhizomes were planted in flat beds with a spacing of 30 cm × 25 cm. Farm yard manure (FYM) @ 30 tonnes ha⁻¹ and neem cake @ 2 tonnes ha⁻¹ were applied by broadcasting. 75 kg N, 50 kg P₂O₅ and 50 kg K₂O were also applied following proper package of practices. Observations were recorded on yield attributes like (length of clump, length and diameter of primary finger, length and diameter of secondary finger) and quality parameters for both the years. The data collected were subjected to statistical analysis following the procedure of Gomez & Gomez (1984). For determination of standard error of mean (S. Em.±) and critical difference (C. D) between the treatment means at 5% level of significance, the statistical table formulated by Fisher & Yates (1979) was referred.

Yield attributes like length of primary fingers varied from 3.00 cm to 3.53 cm length of secondary while fingers varied from 2.53 cm to 3.73 cm (Table 1). The diameter of primary fingers ranged from 1.71 cm to 2.28 cm and that of secondary fingers ranged from 1.65 cm to 1.95 cm (Table 1). The germplasm were aimed for collection as seed rhizome. The rhizome yield plant⁻¹ was maximum with Gorubathan (0.201 kg plant⁻¹). Tiwari (2003) obtained the highest rhizome yield plant⁻¹ in SG 646 (214 g) under the mid-hill conditions of Himachal Pradesh and recommended it as a substitute of Himgiri for fresh ginger production. On the basis of pooled data (Table 1) the projected yield of rhizome ha⁻¹ was also found to be highest in Gorubathan (18.27 t) and lowest in Himgiri (5.45 t ha⁻¹). It is pertinent to add that Singh *et*

Table1. Length of clump, length and diameter of primary and secondary finger, yield, oleoresin and dry recovery of ginger germplasm

Treatments	Length of clump, length and diameter of primary and secondary finger			Fresh rhizome			Projected yield		Dry recovery (%)
	Length of clump (cm)	Length of primary finger (cm)	Diameter of primary finger (cm)	Length of secondary finger (cm)	Diameter of secondary finger (cm)	Yield (kg)	plant ⁻¹ (t ha ⁻¹)	Oleoresin content (%)	
Suprabha	13.63	3.28	2.01	3.64	1.83	0.153	13.89	4.92	26.90
Suruchi	12.77	3.01	2.02	3.24	1.79	0.122	11.09	6.50	28.02
Suravi	12.16	3.12	1.98	3.42	1.74	0.112	10.16	10.25	28.57
V ₃ S ₁ -8	11.14	3.24	1.92	3.73	1.67	0.119	10.75	5.75	31.40
Himgiri	9.25	3.00	1.71	2.53	1.65	0.060	5.45	3.75	29.18
IISR Varada	11.72	3.53	1.91	2.74	1.73	0.131	11.84	5.38	28.58
IISR Mahima	10.68	3.26	1.83	2.94	1.47	0.072	6.53	4.00	32.23
IISR Rejatha	11.83	3.10	1.91	3.10	1.65	0.094	8.57	4.00	27.97
Gorubathan (local cv.)	12.45	3.45	2.28	3.35	1.95	0.201	18.27	3.50	31.85
Sambuk (local cv.)	14.03	3.35	2.16	3.33	1.81	0.162	14.74	3.00	33.48
SEm±	0.52	0.25	0.10	0.23	0.14	0.004	0.79	0.25	1.88
C.D. at 5%	0.78	NS	0.22	0.34	0.21	0.01	0.59	0.38	2.51

al. (1999) identified Thinlaidum (33.4 t) as top yielder with regard to rhizome yield ha⁻¹ and obtained low yield of rhizome ha⁻¹ with Tura under Nagaland condition. The variation in yield at various locations was mainly due to varying agro-climatic conditions and cultural practices followed.

The present investigation indicated highest oleoresin content with Suravi (10.25%) and the lowest with Sambuk (3.00%). Datta *et al.* (2003) reported highest oleoresin in Suravi (10.30%) in the sub tropical humid region of West Bengal. Quality analysis revealed that some amount of variation existed with respect to the locations, as the oleoresin percentage of IISR Mahima and IISR Rejatha was 4.48% and 6.64%, respectively under Kerala condition (Sasikumar *et al.* 2003). In this experiment oleoresin content of IISR Mahima and IISR Rejatha was 4.00% each. Maximum dry recovery (33.48%) was recorded with Sambuk a local cultivar. The lowest dry recovery was obtained with IISR Rejatha (27.97%). Datta *et al.* (2003) obtained the dry recovery of 20.60%, 23.45% and 20.30% with Suprabha, Suravi and Gorubathan, respectively. Sasikumar *et al.* (2003) reported 21.12% and 20.81% dry recovery with IISR Mahima and IISR Rejatha, respectively. This indicated that agro-climatic condition and cultural practices have a profound influence on determining the quality characters of ginger.

The study indicated that the local germplasm also have the potential to perform better following standard package of practices. It

indicated that local cultivars are well acclimatized with the soil and climatic conditions of the state. The other improved cultivars possibly could not exhibit their fullest potential due to variation in soil and climatic conditions from the area of collection.

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